



Watershed Action Plan

Prepared and Submitted by:

The County of San Bernardino Areawide Stormwater Program
NPDES No. CAS618036, ORDER No. R8-2010-0036

Submitted to:

California Water Quality Control Board – Santa Ana Region

May 6, 2013



Table of Contents

Executive Summary	1
Introduction	1
1 Watershed Characteristics	3
1.1 Location	3
1.2 Existing Characteristics	5
1.3 Existing Water Resources.....	5
2 Watershed Protection Principles.....	6
3 Regional NPDES Permit Program Requirements	9
4 Watershed Action Plan Scope	10
4.1 Introduction.....	10
4.2 Purpose	11
5 Planning Development Process.....	11
5.1 Planning Development Process Overview	11
5.1.1 Initial Development Project Meeting with Agency Planning Staff	11
5.1.2 Project Submittal (Pre-Approval)	12
5.1.3 CEQA Analysis	12
5.1.4 Project Approval.....	13
5.2 Post Planning	13
5.2.1 Final WQMP.....	13
5.2.2 Grading Plan	13
5.3 Regional Requirements	16
5.3.1 Low Impact Development.....	16
5.3.2 Hydrologic Condition of Concerns	16
5.3.3 Total Maximum Daily Loads	17
5.4 Tools.....	17
5.4.1 Local Implementation Plan	17
5.4.2 Water Quality Management Plans	17
5.4.3 Watershed Geodatabase	18
6 Hydromodification Management and Monitoring Plans	23
6.1 Hydromodification Management Plan	23
6.2 Hydromodification Monitoring Plan	23
6.3 Hydromodification Assessment.....	23
7 Long-Term WAP Development.....	24
7.1 Administration and Oversight.....	24
7.2 Watershed Benefit Estimation.....	24
7.3 Funding	24
7.4 LIP Revisions.....	24
7.5 WAP Linkages and Other Watershed Efforts	25
7.6 HCOC Exemption Area Determinations and Updates	25
7.7 Recommendations for Streamlining the Regulatory Process.....	26



Tables

Table 1: Existing Water Quality Criteria.....	6
Table 2: WAP Data Layers.....	21

Figures

Figure 1: Santa Ana River Watershed.....	4
Figure 2: Draft Planning Development Process with WAP Integration.....	15
Figure 3: Watershed Geodatabase Mapping Site.....	19

Appendices

Appendix A: Stakeholder Workshop Series Notes	
Appendix B: Hydromodification Assessment Technical Memorandum	
Appendix C: Channel Assessment and Classification Technical Memorandum	
Appendix D: Causes of Degradation Technical Memorandum	
Appendix E: Evaluation of Retrofit Sites for Water Quality Improvements (Phase II) and the System-wide Evaluation to Identify Retrofit Opportunities Technical Memorandum (Phase I)	
Appendix F: System-wide Evaluation to Identify Restoration Opportunities Technical Memorandum	
Appendix G: Watershed Geodatabase Data Dictionary	
Appendix H: Hydromodification Management and Monitoring Plan	
Appendix I: WAP Development Task Force	
Appendix J: Watershed Geodatabase Workshops	



Executive Summary

The Watershed Action Plan (WAP) for the San Bernardino County Flood Control District (District), the County of San Bernardino (County) and 16 cities within the County, collectively known as Co-Permittees, is a requirement of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer (MS4) Permit No. CAS618036 and Santa Ana Regional Water Quality Control Board (RWQCB) Order R8-2010-0036 (Permit) Section XI.B. It has been developed by the County of San Bernardino Areawide Stormwater Program (Program) through a collaborative process with the Co-Permittees, and other watershed stakeholders. The WAP development involved several WAP Task Force meetings and WAP development and training workshops where watershed stakeholders provided input on the WAP and watershed development process.

Upon final approval of the WAP by the RWQCB, the Co-Permittees will implement the WAP, update the appurtenant jurisdictional documents (i.e. Local Implementation Plan), and provide an update of implementation tasks in their Annual Report submittals.

The WAP is designed to be a living document so that as more information is developed in the watershed, barriers to watershed protection principles are identified, and innovative ideas to furthering Integrated Water Management (IWM) concepts are identified, they can be incorporated into the document. New watershed information, new WAP initiatives, and changes to the approved WAP will be made after soliciting feedback from all stakeholders to ensure the WAP continues to be the guiding document to achieve effective IWM in the SAR Watershed.

Introduction

The WAP has been developed to provide general guidance for use by jurisdictional planning staff, project proponents, environmental consultants, RWQCB staff and the general public in determining water quality specific environmental assessments for land development projects.

As required by the Permit, this document discusses the regional requirements, standard CEQA planning processes, regionally available tools to assist with assessment determination and long-term vision for further implementation. The purposes of each of the seven sections of the WAP are summarized below:

- Section 1: Watershed Characteristics – Provide details of the watershed location and size, jurisdictions, hydrologic subareas, tributaries, terrain, climate, vegetation, and water quality issues.
- Section 2: Watershed Protection Principles – List the required Permit principles, as well as additional principles identified by the stakeholders.
- Section 3: Regional NPDES Program Permit Requirements –Discuss the Permit requirements, the intent and goal of the WAP, how to achieve the goal, and WAP program specific objectives.
- Section 4: Watershed Action Plan Scope – Discuss how the WAP is to be used as a guidance tool for the Planning Department Approval Process.
- Section 5: Planning Development Process – Provide an overview of the process as well as details about the pre-approval submittal, CEQA analysis, project approval, post-planning (WQMP, grading), Regional Requirements (LID, HCOC, assessment & classification, stream degradation, and TMDL), and Tools (LIP, WQMP, and Geodatabase).



- Section 6: Hydromodification Management and Monitoring Plans – Provide an overview of HMP, HMoP, and assessment processes.
- Section 7: Long-Term WAP Development – Address issues and provide guidance to ensure the long-term success of the WAP and goal attainment.

The background information presented in the appendices to this document includes:

- Appendix A: Stakeholder Workshop Series Notes
- Appendix B: Hydromodification Assessment Technical Memorandum
- Appendix C: Channel Assessment and Classification Technical Memorandum
- Appendix D: Causes of Degradation Technical Memorandum
- Appendix E: Evaluation of Retrofit Sites for Water Quality Improvements (Phase II) and the System-wide Evaluation to Identify Retrofit Opportunities Technical Memorandum (Phase I)
- Appendix F: System-wide Evaluation to Identify Restoration Opportunities Technical Memorandum
- Appendix G: Watershed Geodatabase Data Dictionary
- Appendix H: Hydromodification Management and Monitoring Plan
- Appendix I: WAP Development Task Force
- Appendix J: Watershed Geodatabase Workshops
- Appendix K: Evaluation of Retrofit Sites for Water Quality Improvements Technical Memorandum

Please note that the Local Implementation Plan (LIP), Water Quality Management Plan (WQMP), Low Impact Development (LID) guidance and the Integrated Watershed Management Plan (IWMP) are necessary references and/or components in the evaluation and decision process. The LIP may be obtained from the local jurisdiction and the remaining documents are found under separate cover located at the Program website: (http://www.sbcountystormwater.org/gov_per.html)



1 Watershed Characteristics

The Santa Ana River watershed includes much of Orange County, the northwestern corner of Riverside County, the southwestern corner of San Bernardino County, and a small portion of Los Angeles County. The watershed is bound on the south by the Santa Margarita watershed, on the east by the Salton Sea and Southern Mojave watersheds, and on the northwest by the Mojave and San Gabriel watersheds. The entire watershed encompasses approximately 2,650 square miles. This document applies to only the Santa Ana River watershed within San Bernardino County limits.

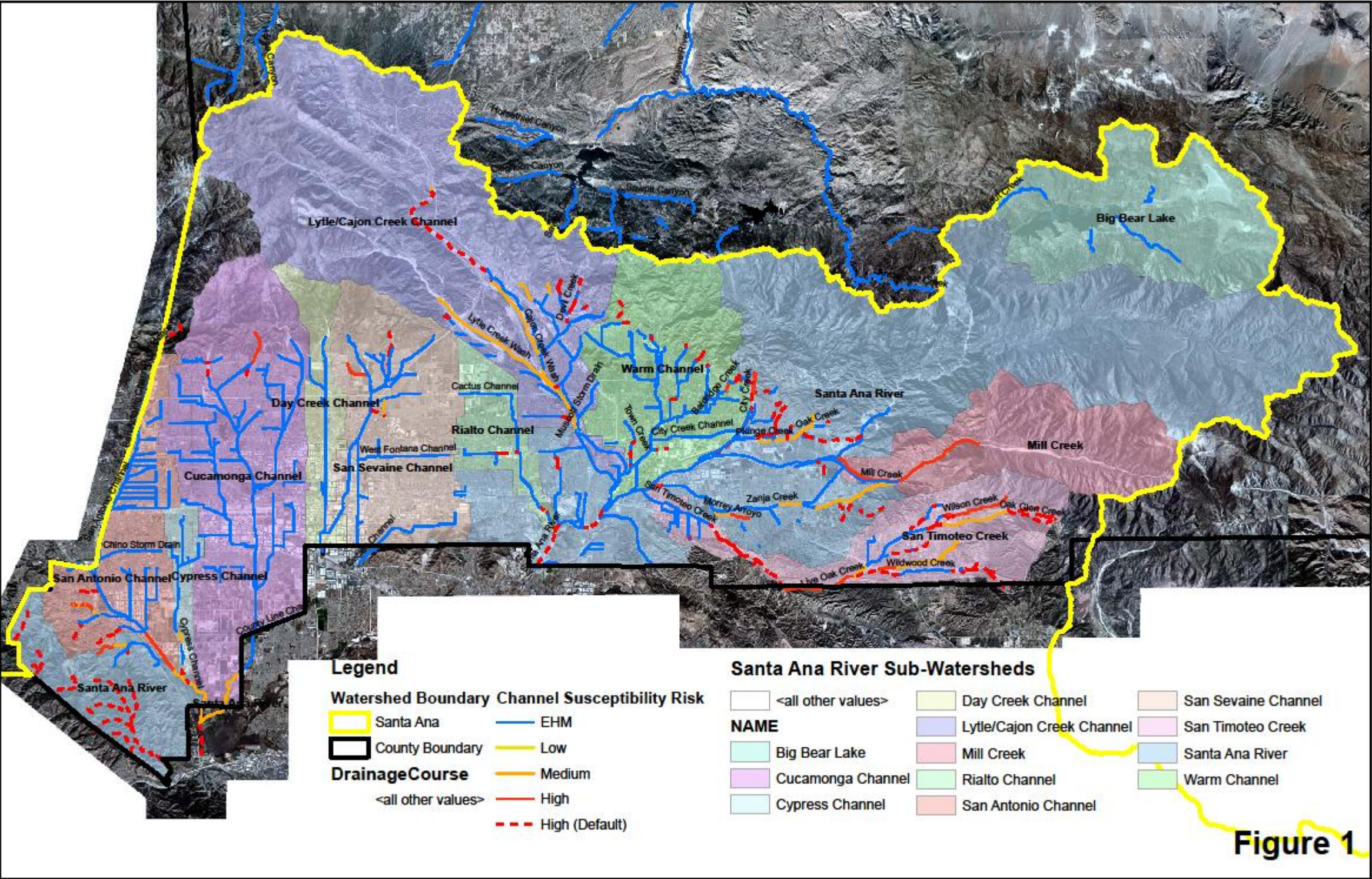
The jurisdictions covered by this document include the County of San Bernardino, cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, Upland, Colton, Fontana, Grand Terrace, Highland Loma Linda, Redlands, Rialto, San Bernardino, Yucaipa and applicable portions of unincorporated San Bernardino County.

1.1 Location

Figure 1 presents the Santa Ana Watershed within the San Bernardino County boundaries. From a hydrological standpoint, the San Bernardino County portion of the Santa Ana River Watershed is broken down into a number of hydrologic subareas, based on topography and current storm drain systems. The significant hydrologic subareas include:

San Antonio Channel	Rialto Channel
Cypress Channel	Lytle/Cajon Creek Channel
Cucamonga Channel	Warm Channel
Day Creek Channel	Mill Creek
San Sevaine Channel	San Timoteo Creek / Live Oak
Santa Ana River	Big Bear Lake

The headwaters of the Santa Ana River are located in the San Bernardino Mountains. Two major contributing tributaries in the San Bernardino Mountains are Bear Creek and Mill Creek. Other contributing tributaries include Lytle Creek, originating in the San Gabriel Mountains; and the San Jacinto River, originating in the San Jacinto Mountains. These major tributaries confluence to form the Santa Ana River in the San Bernardino Valley, which is located at the southern base of the Transverse Ranges of the San Bernardino Mountains.





The Santa Ana River traverses through the San Bernardino Valley before cutting through the Santa Ana Mountains and flowing to the Orange Coastal Plain. Eventually the river discharges to the ocean in the City of Huntington Beach.

Another significant water management feature within this region is the network of flood control dams. The Seven Oaks, Prado, San Antonio and other smaller dams are all integral features in the highly managed flood control and water supply regional system.

1.2 Existing Characteristics

As described, the upper tributaries of the watershed consist of mountainous terrain home to the San Bernardino National Forest. The hydrologic flows from the Forest proceed to the main Valley where they are managed through flood control conveyance systems and the regulated MS4 systems. Approximately one-third of the San Bernardino Valley land use is a combination of heavy and light industrial, with commercial and residential land. Agricultural land makes up approximately one-tenth of the watershed and the watershed is home to approximately 5 million people.

The San Bernardino Valley is founded on a large alluvial fan created through historical storm events. Existing soil conditions are relatively consistent throughout the valley and foothills of the San Bernardino Mountains. The western and central foothills contain mainly sandy to gravelly loams with more fine sands in the south and gravelly deposits in the north. The eastern portion of the foothills contains predominately sandy and gravelly loams with more coarse gravelly sandy loams in north east areas. The upper east foothills contain more stony loamy sand. Bedrock becomes more apparent in higher elevations with decreasing amounts of gravelly coarse sand. In general, subgrade infiltration characterization throughout the Valley is good with localized areas having poor to moderately good infiltration.

Due to the climate, there is little natural perennial surface water in the watershed. Rainfall ranges from 18 inches per year in the inland valleys to 40 inches per year in the mountains and occurs predominantly in the winter season. Flows from the National Forests to Seven Oaks Dam and then from the Seven Oaks Dam to the City of San Bernardino consist of storm flows, snowmelt and rising groundwater. From the City of San Bernardino to the City of Riverside, the Santa Ana River flows perennially, however a high percentage of these flows is effluent from publicly owned treatment works (POTW). From the City of Riverside to northern part of Orange County, dry-weather flow primarily consists of POTW discharges and also urban runoff, irrigation runoff water and artesian groundwater.

Throughout the region, chaparral vegetation, Sage scrub and the Yucca plant are the predominant natural vegetation along washes and uplands. Other vegetation consists of a patchwork of grasslands, riparian woodlands, and mixed hardwood forests, which border the valley in the mountains on the north and east. Most of the Valley is not naturally vegetated as development and growth have been occurring for approximately 150 years.

1.3 Existing Water Resources

There are many natural resources in the San Bernardino portion of the Santa Ana River Watershed. The Santa Ana Regional Water Board Basin Plan has identified beneficial uses throughout the Region that must be mitigated for in proposed development and land uses. A list of these uses can be found on the RWQCB website at: (http://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.shtml)



Table 1 provides a list of the sub-watersheds within the Program area and the water quality issues currently associated with them.

Table 1: Existing Water Quality Criteria

Sub-Watershed	Listed for TMDL	Within CBRP area	Listed 303(d)
Big Bear Lake	X		X
Cucamonga Channel	X	X	X
Cypress Channel	X	X	
Day Creek Channel	X	X	
Lytle/Cajon Creek Channel			X
Mill Creek			X
Rialto Channel	X	X	
San Antonio Channel	X	X	X
San Sevaine Channel	X	X	
San Timoteo Channel			
Santa Ana River	X**		X
Warm Channel			

* See the on-line Geodatabase for additional details.

** Only certain reaches are listed for TMDL

Natural rivers and streams provide a sustainable living environment for native habitat. The Santa Ana Watershed contains some of the best and largest riparian habitat in all of Southern California, primarily in the Prado Basin. This area is home to more than 300 species of plants, 13 species of reptiles, 47 species of breeding birds, 11 raptor species, and 23 mammal species. Included are threatened and endangered species such as the least Bell's vireo, Arroyo chub, and Santa Ana sucker.

2 Watershed Protection Principles

This document provides guidance on the use of watershed protection principles that complement the environmental planning analysis process. Planning staff are encouraged to



promote these principles during the planning process to the extent practicable. These principles, as designated in Permit Section XI.C.3, include:

- a. Promote the avoidance of disturbance of natural water bodies, drainage systems and flood plains; conserve natural areas; protect slopes and channels; minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies.
- b. Minimize changes in hydrology and pollutant loading; require incorporation of controls, including structural and non-structural Best Management Practices (BMPs), to mitigate any projected increases in pollutant loads and flows; ensure that post-development runoff rates and velocities from a site do not adversely impact downstream erosion and stream habitat; minimize the quantity of stormwater directed to impermeable surfaces and the MS4s; and maximize the percentage of permeable surfaces to allow more percolation of stormwater into the ground.
- c. Promote the preservation of wetlands, riparian corridors, and buffer zones; establish reasonable limits on the clearing of vegetation from the project site.
- d. Use properly designed and well maintained water quality wetlands, biofiltration swales, watershed-scale retrofits, etc., where such measures are likely to be effective and technically and economically feasible.
- e. Provide for appropriate permanent measures to reduce stormwater pollutant loads in stormwater from the development site.
- f. Establish development guidelines for areas particularly susceptible to erosion and sediment loss.
- g. Consider pollutants of concern (identified in the risk-based analysis provided in the 2006 Report of Waste Discharge (ROWD), the annual reports and the list of impaired water bodies (303(d) list) and propose appropriate control measures.

In addition, through collaborative stakeholder efforts, additional watershed protection principles were identified and include:

- Ahwahnee Water Principles
- Use of design BMPs to mimic a site pre-development hydrology (maximize permeable areas, conserve natural resources, minimize directly connected impervious areas).
- Use of the California Environmental Quality Act (CEQA) as an opportunity to encourage the use of LID concepts into project design.
- Maintaining stormwater runoff capture in local basins rather than using the prior conventional approach of allowing runoff to be sent to the ocean.
- Expansion of treatment and infiltration facilities to move toward a balance of water resources within a basin.
- Integration of watershed protection principles while processing new development and existing re-development projects through the early stages of the planning process.

These watershed protection principles are to be incorporated into Co-Permittee planning procedures, including CEQA compliance document preparation, mitigation measures, General Plans and Specific Plans, Conditions of Approval, site plans, tract maps, and the Water Quality



Management Plan (WQMP) development and approval process. The implementation recommendations for the planning process include:

CEQA

- Promote project-specific analysis and study concerning potential water quality impacts during the initial environmental review process.
- Consistently apply CEQA cumulative impacts analysis emphasizing regional water quality impacts and watershed management.

General Plans / Specific Plans

- Incorporate the Chino Basin Recharge Master Plan, San Bernardino Valley Water District Master Plan and other pertinent water use and conservation plans to identify opportunities for infiltration as part of General Plan updates.
- Include water quality solutions and design considerations at an earlier stage of the project inception process.
- Evaluate county and city municipal codes to better integrate public works/engineering data and documentation with planning processes and environmental determination.
- Evaluate adequacy of integration of overall water quality issues with supply, re-use, recycled uses, flow and erosion.
- Implement LID practices as a planning strategy and design principle approach.
- Promote regional and sub-regional LID and treatment opportunities.
- Request and encourage the resource agencies to participate in streamlining the project intake and evaluation process, which is critical to assisting with the next steps in development.

Conditions of Approval / Tract Maps / Site Plans / WQMPs

- Proactively incorporate development of the Preliminary WQMP at the earliest stages of the planning process.
- Include watershed features in appropriate development maps and site plans.
- Evaluate site development for a collaborative approach to water quality, supply, and conservation to implement the Water Protection Principles of the WAP.

Removing Barriers to Implementation

- Modify the plan checking process to better incorporate water quality and LID.
- Provide offsite opportunities for water quality improvement in the implementation process.
- Communicate with policy makers within agencies regarding local implementation of water quality features and LID requirements.
- Evaluate linkages to other water quality and watershed programs.



Recommendations

- Collaborate with the regional water supply and conservation agencies and with the RWQCB.
- Maximize the multi-purpose benefits created by storm drain and water recharge infrastructure improvements and facility retrofit projects.

It is recognized that there are barriers that do hinder implementation of some of the principles on a project-specific basis. In the hierarchy of jurisdictional management, public and property safety and existing legal decisions, are the highest priority in decision-making criteria. There will be situations when the following barriers may prevent full implementation of a particular principle:

- Existing land use laws
- Conflicting land development policies
- Use of existing flood control structures for purposes other than their primary use and objectives. Partnerships with regional water supply and conservation agencies and the Flood Control District are critical for balancing conflicting uses.
- Existing adjudication decisions concerning water rights and beneficial uses of existing watersheds. Including existing habitat and resources preservation areas.

3 Regional NPDES Permit Program Requirements

The Permit identifies specific requirements for the development of the WAP. The intent of the WAP, as identified by the RWQCB in the MS4 Permit Fact Sheet, is to document a long-term holistic approach to address water quality and hydromodification impacts resulting from development projects. This goal is to be achieved through integration of water quality, stream protection, stormwater management, and re-use strategies with land planning policies, ordinances, and plans within each jurisdiction to the maximum extent practicable (MEP). The RWQCB emphasized that the plans for each jurisdiction should address cumulative impacts of development on vulnerable streams; preserve or restore, consistent with the MEP standard, the structure and function of these streams; and protect surface water and groundwater quality.

The specific requirements for development of the WAP document are set forth in Order No. R8-2010-0036 Section XI, New Development (including Significant Re-Development), Sub-section B, Watershed Action Plan. The first requirement of the WAP was for the Program to develop an IWM approach to improve integration of planning and approval processes with water quality and quantity control measures. The WAP is required to document the criteria that each of the Co-Permittees would use to review the watershed protection principles and policies, specifically addressing urban and stormwater runoff in their planning procedures.

The WAP Program Specific Objectives are a requirement identified in the MS4 permit. The Objectives are:

1. Update General Plans with elements of the WAP and watershed protection principles, remove barriers to watershed protection principles and LID, and coordinate recharge master plans per the next scheduled update of each jurisdiction's General Plan.
2. Evaluate and update appropriate municipal codes and ordinances to incorporate WAP elements, watershed protection principles, and IWM principles for all jurisdictions by the end of the permit term.



3. Educate the primary participants, including elected officials, in the development process about watershed protection, water quality improvement, LID and IWM by the end of the permit term (2015).
4. Educate and train agency planning staff regarding use of the WAP document and WAP Geodatabase as a planning tool and how to perform analysis of project specific and cumulative project water quality impacts and an IWM analysis and recommendations for a project within 90 days of approval of implementing document(s) identified in Order No. R8-2010-0036, NPDES No. CAS618036.
5. Require agency planning staff for all jurisdictions to use the WAP as a planning tool to understand the physical aspects, potential project specific and cumulative water quality impacts of a project, and to perform an IWM analysis and provide recommendations after an initial project meeting as part of the entitlement phase of a project within 90 days of approval of implementing document(s) identified in Order No. R8-2010-0036, NPDES No. CAS618036.
6. Require project proponents to perform an IWM analysis of the project site using the WAP document and the WAP Geodatabase as a planning tool and submit this analysis as part of the entitlement submittal.
7. Require agency planning staff and project proponents to identify natural water bodies, natural areas, wetlands, and riparian corridors and buffer zones as part of the entitlement process and require project proponents to develop an analysis of potential measures for protection and conservation of these areas that could be integrated into the design of the project and submit this analysis as part of the entitlement submittal by the end of the permit term (2015).
8. Require project proponents to develop an analysis of options for minimization of changes in the hydrology and pollutant loading of the project site and submit the analysis with the entitlement process submittal.
9. Require project proponents to submit a preliminary WQMP as part of the project submittal (pre-approval) for all projects that trigger the development of a WQMP for all jurisdictions as specified in Section XI.D.3 of Order No. R8-2010-0036, NPDES No. CAS618036.¹

4 Watershed Action Plan Scope

4.1 Introduction

The WAP, prepared by the Program, is a specific requirement in the Permit and is intended for implementation of an integrated water resources approach in the Santa Ana River Watershed by providing additional guidance for the Planning Department approval process. The WAP is a

¹ Currently in most jurisdictions Preliminary WQMPs are required during the CEQA assessment phase of the project; however, this phase is too late as projects are in most cases designed by the CEQA assessment Phase. Requiring a Preliminary WQMP in the first submittal to the jurisdiction (pre-approval), will ensure that water quality and LID site design is incorporated into the plan and design of the project.



collaborative effort between the Program and other affected stakeholders in the watershed through the WAP Task Force. The timeline for the implementation of the WAP by each jurisdiction is undefined due to the requirements of the various jurisdictions.

4.2 Purpose

The WAP document is a planning process guidance tool to improve integration of water quality, stream protection, stormwater management, water conservation and re-use, and flood management in land use planning and the development process through an IWM approach. To help accomplish this goal of addressing water quality early in the development process, planners will refer development project proponents to the WAP as a resource in the initial discussions of a new development project. Planners will use this document and associated on-line Geodatabase (<http://sbcountry.permitrack.com/wap/>) to better understand the development project site and any applicable project constraints from a water quality perspective, the potential water quality issues for the site, and potential cumulative water quality impacts to which the site may contribute.

The IWM Approach is a sustainable development approach designed to improve land and watershed management. The IWM approach promotes the coordinated development and management of water and land in order to protect vital ecosystems while maximizing economic and social welfare. The IWM approach involves applying knowledge from various disciplines as well as the insights from diverse stakeholders to devise and implement efficient, equitable and sustainable solutions to water and development problems.

Watershed priorities and watershed protection principles that resulted from the development of this document are coordinated and implemented as priorities through the individual Co-Permittees' LIP.

In consideration of the watershed protection principles identified in this document and in their LIP, Co-Permittees can accept or reject each of the watershed protection principles as some of the watershed protection principles either may not apply to a jurisdiction or there may be adequate justification why a watershed protection principle cannot be incorporated into a jurisdiction's LIP. Co-Permittees must incorporate into its LIP why the watershed protection principle is rejected. If the Co-Permittee accepts a watershed protection principle it must identify in their LIP how they will implement the watershed protection principle.

5 Planning Development Process

5.1 Planning Development Process Overview

This section provides a general description of a typical planning development process. This overview also addresses steps for incorporation of IWM concepts throughout the planning process in a typical agency. By incorporation of the revised development process identified here into each jurisdiction's municipal codes, ordinances, and General Plan municipal planners will have the guidelines necessary to ensure water quality and LID is incorporated at the earliest stage of the development process. The following steps apply to the project evaluation and approval process.

5.1.1 Initial Development Project Meeting with Agency Planning Staff

The first presentation of a new development project to an agency typically takes place in an initial meeting with the appropriate planning staff in which the development project proponent



presents the scope and location of the project proposed. Preliminary plans for the project are presented, and the planning staff asks questions and provides initial input about the project as well as makes a determination of whether or not the proposed project is appropriate under the general plan, specific plan and/or zoning of the area requested.

At this stage, it is necessary for planning staff to direct the project proponent to the WAP document and Geodatabase (<http://sbcounty.permitrack.com/wap/>) described in Section 5.4.3. The WAP will be used by planners to identify the potential effects of the project on water quality, both from a project specific-basis and from a cumulative impact basis based on the surrounding developments. Additionally, the Geodatabase should be referenced by planning staff to identify the physical characteristics of the project site, as well as identify the associated existing regional studies. The information gathered at this stage will be used to provide a preliminary determination of potential impacts to water quality from a proposed project and to determine what the appropriate design considerations need to be.

Once the initial project-specific impacts, cumulative impacts, project site physical aspects, and issues and elements of IWM have been explored, the planners should examine the results of this analysis and make initial project-specific recommendations to the proponent explaining how to incorporate IWM concepts into the project design prior to the filing of an application for the entitlement to develop the project.

5.1.2 Project Submittal (Pre-Approval)

At this stage the municipal planning staff completes an initial project evaluation/consultation with the developer and identifies the appropriate type of entitlement process for the project. The project proponent will formally submit the project to the appropriate approving agency, as well as provide input regarding design changes which may be necessary for consideration of water quality issues. The initial filing requirements and steps may vary in different jurisdictions, but generally include the following:

- Initial Application and filing of the project request in the appropriate jurisdiction
- Tentative Map or site plan of the project
- Submittal of checklist items required for filing (including any required project-specific technical reports)
- A preliminary WQMP (if applicable)

The preliminary WQMP for the project would be evaluated by appropriate agency staff for adequacy and appropriateness for the project design. If the preliminary WQMP is deemed adequate, the project would then be deemed a complete filing (assuming all other submittal requirements have been met) and will move forward into the entitlement process.

5.1.3 CEQA Analysis

Development projects are subject to review under CEQA. The initial vehicle for CEQA analysis is the CEQA initial environmental study checklist (IS). The WAP document provides guidance and resources to planners and, per the Permit, must be used in the required CEQA checklist environmental determinations.

For example, data from a preliminary WQMP and the Geodatabase will be considered during the CEQA analysis to assist in assessing the level of project impact and the formulation of effective mitigation measures. Evaluation guidelines pertaining to water quality impacts are contained in each individual jurisdiction's LIP.



5.1.4 Project Approval

In addition to the CEQA analysis, the project will be reviewed by all affected agencies and departments for their specific project approval requirements. At the end of this review, planning staff will assemble all necessary conditions of approval, required mitigation measures and design considerations and assist the project proponent in developing the final project design that can be approved by the lead agency subject to these conditions and mitigation measures. The IWM recommendations should be coupled with the specific water quality requirements the project will need to implement at the project site. The recommendations and identification of water quality requirements will be provided to the project proponent with the conditions of approval for the project and approved final project design.

5.2 Post Planning

5.2.1 Final WQMP

Once the final design of the project has been issued entitlement approval subject to conditions, the Final WQMP is developed in collaboration with the final design of the project and is submitted prior to the start of project construction (usually with the grading plan). If the Final WQMP is the first time the project proponent considers water quality, the WQMP will typically not effectively address water quality. To implement the LID requirements of the new permit, water quality must be addressed in the planning phases of a project. LID is not an end-of-pipe water quality approach, but rather a land development approach that needs to be considered in the planning stages of a project.

The Final WQMP should reflect any changes in project design from the time of the preliminary WQMP and address any new impacts that were identified in the CEQA and project review processes. The Final WQMP must obtain approval from appropriate agency staff prior to the construction phase of the project.

5.2.2 Grading Plan

Once a final design of the project is developed, a grading plan is submitted to the affected agency for review and approval. The grading plan components include:

- Detailed Grading Plan
- Elevations, dimensions, location, extent, and slope of proposed grading,
- Approved Tentative Map or Site Plan
- Preliminary Title Report
- Soils Report
- Hydrology Study
- SWPPP, when required by the Permit (including WDID No.)

The Grading Plan must be consistent with the WQMP and receive approval from appropriate agency staff prior to the construction phase of the project. Particular attention will be given to preserving the infiltration rates of soils where LID BMPs will be located. Prior to approval of the Grading Plan the project proponent shall include documentation of the WDID number on the plans and in the application paperwork. This may include a copy of the State Water Resource Control Board NOI and/or the WDID Number reference on the plan.

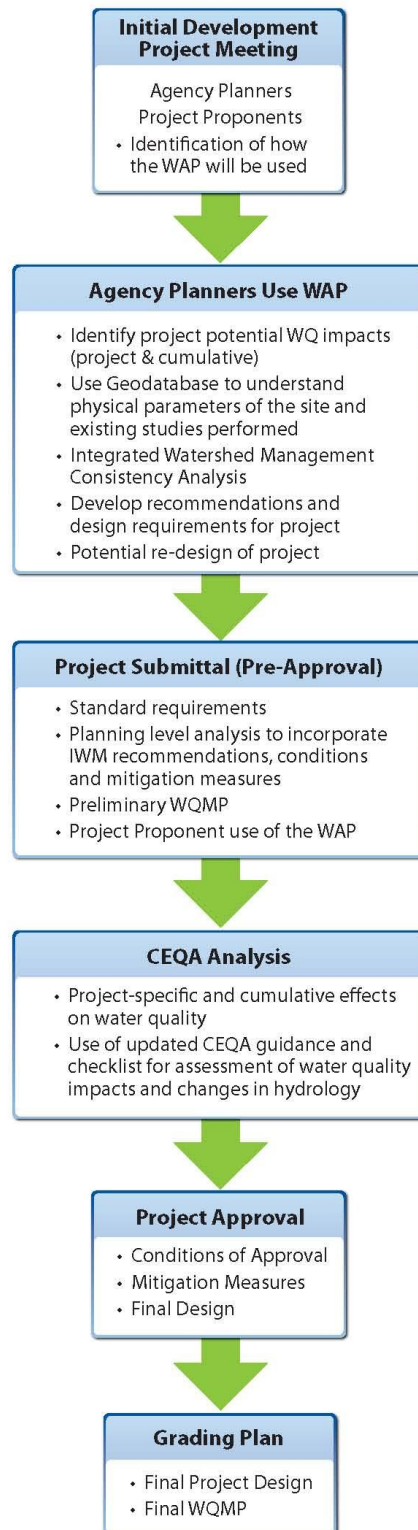


Every stage of project review should utilize the WAP for water quality guidance and project design considerations to accomplish the IWM approach to project development and, ultimately, improve water quality.

A flow chart of the planning development process showing how the WAP is to be used is provided in **Figure 2** below.



Figure 1: Draft Planning Development Process with WAP Integration





5.3 Regional Requirements

5.3.1 Low Impact Development

The Permit specifically requires the implementation of a Low Impact Development (LID) approach associated with priority projects. LID is not merely construction of different types of vegetated stormwater treatment BMPs, but an approach to land development with the goal of mimicking the pre-development hydrology of a site which will assist in restoring overall watershed health. An LID approach emphasizes the planning of a site to maintain or restore the natural hydrology as the primary design principle. It is only after site design principles are evaluated and incorporated, that LID integrated management practices (i.e. treatment BMPs) should be evaluated for use.

Incorporating LID into the planning and design process of every project will greatly benefit the watershed over time through restoration and maintaining the watershed hydrologic functions. Targeting all priority projects will ensure most new improvements and development are designed to maintain, restore, and improve water quality. LID design requirements are incorporated into the WQMP Template and design review process.

5.3.2 Hydrologic Condition of Concerns

Projects that have the potential to cause or contribute to downstream Hydrologic Condition of Concerns (HCOC), are required to implement onsite hydrologic and management controls. The Hydromodification Management Plan (HMP) includes various decision matrices that are geared toward helping Permittees navigate through the HMP criteria and applicability requirements for all types of development or re-development projects. Hydromodification exemption criteria and alternative compliance measures are identified within the HMP.

The WQMP shall be the primary instrument for implementation of on-site hydrologic management controls.

Channel Assessment and Classification

The WAP Geodatabase provides information on the delineation of existing unarmored or soft-armored drainages in the permitted area that are vulnerable to geomorphology changes due to hydromodification, as well as channels and streams that are engineered, hardened, and maintained. The Channel Assessment and Classification Technical Memorandum, provided in Appendix C, discusses how the existing drainages were classified using the San Bernardino County Flood Control District System Index and the Rapid Stream Risk Classification method created by WEST Consulting, Inc. The existing watersheds were delineated and the drainages were broken into six classifications based on the two methodologies:

- Engineered, Hardened, and Maintained (EHM)
- Non-EHM, Low Risk;
- Non-EHM, Medium Risk;
- Non-EHM, High Risk;
- Non-EHM, Default High Risk;
- Santa Ana River.

Refer to the Geodatabase for identification of areas that drain to an EHM in the permitted area.



Causes of Stream Degradation

As part of the WAP, the permittees are required to identify potential causes of identified stream degradation including a consideration of sediment yield and balance on a watershed or subwatershed basis. The “Causes of Degradation Technical Memorandum”, provided in Appendix D, investigates three major watersheds within the County of San Bernardino: San Antonio Watershed, Cucamonga Watershed and Live Oak Watershed and determines how degradation has occurred as the watersheds have matured. Aerial photographs, site visits and a GIS-based desktop study developed by the Southern California Coastal Water Research Project (SCCWRP) were used to analyze the watersheds. The memorandum concluded that there were three main causes for the degradation: the watersheds were dominated by Cenozoic Sedimentary Rocks – Alluvium, which is vulnerable to erosion; the watersheds have been developed causing a sediment imbalance; and basins have been constructed preventing the transport of sediment from the upstream reaches of the watersheds.

5.3.3 Total Maximum Daily Loads

Total Maximum Daily Loads (TMDLs) are key requirements that require Co-Permittees to reduce pollutants within the watershed. Multiple TMDLs exist within the watershed and the on-line Geodatabase is an essential tool in tracking the progress of each. The Geodatabase provides information relevant to assessing a project’s potential impacts in a TMDL program.

For example, local municipalities subject to the Middle Santa Ana River Pathogen TMDL have developed the Comprehensive Bacterial Reduction Program (CBRP), such that implementation of the CBRP satisfies Basin Plan Amendment requirements and is sufficient for implementation of the TMDL. Table 1 presents those jurisdictions “within the CBRP area.” Planners in these jurisdictions should familiarize themselves with this document and its inherent requirements regarding water quality mitigation.

Planning staff need to also understand that TMDLs are continuously being analyzed and adopted; it is probable that over the project approval process timeframe changes to TMDLs may occur and will need to be incorporated.

5.4 Tools

5.4.1 Local Implementation Plan

Each Co-Permittee’s LIP describes how that jurisdiction will implement the mechanisms, procedures, and/or programs described in this document into the planning process. Planning staff should familiarize themselves with the LIP document and the planning and development review processes contained therein.

5.4.2 Water Quality Management Plans

Land development activities need to be addressed to meet certain aspects of the Permit. The 2013 Water Quality Management Plan (WQMP) template focuses on individual new and re-development projects within the watershed. Targeting all of these projects will ensure all significant new improvements, developments and re-developments are designed to maintain, restore, and improve water quality. Incorporating updated design requirements into the WQMP will greatly benefit the watershed.

The WQMP is a detailed document for mitigating water quality impacts of affected projects. The watershed protection criteria addressed in Section 2 of this document and integrated in the WQMP are identified in the online Geodatabase. A planner’s utilization of this interactive tool,



and its inherent watershed-specific information, will help enhance the design review process as well as assist in making beneficial water quality decisions on projects.

5.4.3 Watershed Geodatabase

The Watershed Geodatabase is the primary interactive reference tool for plan review regarding water quality. The Geodatabase is designed in such a manner as to allow for continuous live access to stormwater facility data, reports and studies, and data to support other regulatory processes such as WQMP development and approvals, CWA Section 401 Water Quality Standards Certifications (401 Certifications), and LID BMP feasibility evaluations over the Internet using only a web browser. The goal is to provide the information in a single, centralized, and maintained location for the planners and project proponents.

The Geodatabase is, and will remain, a work in progress, both from a data standpoint and in its functionality. A data maintenance plan has been developed and is presented in this document in order to ensure the complete, current, and accurate nature of the information within the limits of available data.

Technology and Functionality

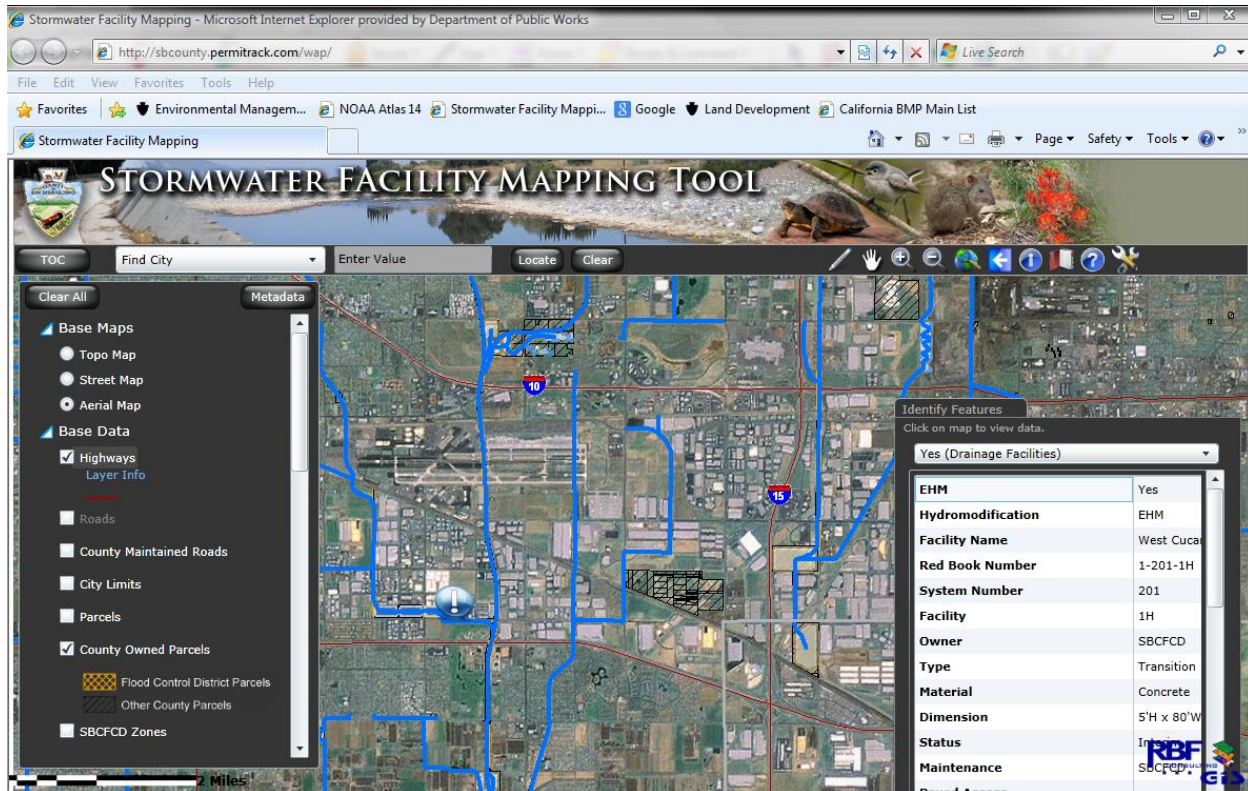
The Geodatabase has been developed and optimized for the Microsoft Internet Explorer version 7 browser; however, it will operate to varying degrees in other browser environments. The mapping application is also supported by the Microsoft Silverlight version 4 browser plug-in, which is required to view the media rich content of the site including the mapping. The Geodatabase is accessible through the domain address: <http://sbcounty.permitrack.com/WAP> (see Figure 2).

No additional software need be purchased and installed in order to use the application. In addition, a comprehensive help document and quick start guide are included as part of the site.

Design guidelines were employed which allow a novice user to access most of the site's functionality without any training. However, in order to access some of the more advanced functions and to aid the user in understanding the content of the reference data and supporting studies, individual jurisdictions will be responsible for training of applicable staff, as necessary.



Figure 2: Watershed Geodatabase Mapping Site



The mapping site provides basic functionality for bringing up a map and moving the field of view around the permitted area.

The Watershed Geodatabase has the following functionality, capabilities, and layers, which are implemented in the Silverlight environment.

- Navigation tools: Pan, Zoom In, Zoom Out, Zoom Extents, Back Extents, Identify, Measure, Activate Layer, Select by creating Polygon
- Searches: Find City, Find Channel Facility, Find Water Storage, Find Flood Control Parcel APN, Find Thomas Bros page,
- Base Map Layers: ESRI Prime World imagery, NGS Topo US 2d, Highways, County owned parcels – Flood Control District Owned Parcels, Drainage Course Facility Reaches, Water Storage Facilities, City Storm Drain, Street data, Counties, City Limits, Thomas Bros Page, County Flood Zone,
- Other Basic Functionality: Map Print, Map Legend, Image disclaimer, Help page, Metadata for each layer.

Main stormwater reference layers included in the site are listed below. A complete list of data included in the Watershed Geodatabase is presented in the data maintenance section, and the data dictionary is provided in Appendix G.

1. Stormwater Drainage Facilities including channels and basins
 - a. County Red-Book Number
 - b. Physical Characteristics (width, depth, shape, material)
 - c. Maintenance Responsibility
 - d. EHM, Low/Med/High Susceptibility to Hydromodification



- e. Facilities draining to a HCOC
2. Local and Regional Drainage Boundaries
3. Controlled Release Points
4. Sensitive species and Protected Habitat areas from the County of San Bernardino General Plan, State Department of Fish and Game, and the Federal Fish and Wildlife Service
5. Potential stormwater recharge areas and/or reservoirs
6. Groundwater basins including groundwater surface contours
7. Groundwater contamination plumes
8. NRCS Soil Classifications
9. 303(d) listed water bodies, addressed TMDLs, and associated pollutants
10. Regional and Sub-Regional BMP Facilities

Additional reference material is provided in the form of links to supporting documentation. These mainly include:

1. Construction and As-build Drawing documents by facility
2. Relevant Stormwater and Groundwater Documents and Studies collected to support the WAP

Maintenance and Enhancement Schedule

One of the main objectives of the Geodatabase is to develop and implement a plan to keep the reference material provided on the site up to date. This data maintenance plan will assist with identifying data layers that are included in the Geodatabase, the source of the data, the party responsible for data maintenance, the frequency of maintenance, and the last time the data layer was updated. Further, since many of these layers are maintained simultaneously by multiple agencies, this data maintenance plan will identify a specific source and maintenance responsibility to determine best maintenance practices and eliminate duplication of effort. The data maintenance plan indicates that the Program will evaluate and update as necessary each of the data layers with a minimum frequency of semiannually unless a specific data set has a known longer update cycle.

The layers presented on the site and maintained in support of the WAP are shown in Table 2.



Table 2: WAP Data Layers

Description	Source	Responsibility	Update Frequency	Last Modified
Parcels	County	County DPW	Quarterly	06/01/2010
Street Centerlines	County	County DPW	Bi-Annually	06/01/2010
Street Centerlines w/in each City	Program	Stormwater Program	Bi-Annually	10/01/2010
City Boundaries	County	County DPW	Bi-Annually	04/01/2010
County Boundaries	County	County DPW	Bi-Annually	08/05/2008
County Maintained Roads	County	County DPW	Bi-Annually	08/05/2008
County Owned Parcels	County	County DPW	Bi-Annually	11/08/2007
2006 303d Listed Rivers in SB Co	CA.GOV - SWRCB	Stormwater Program	Every 2 years	09/15/2010
2006 303d Listed Waters in SB Co	CA.GOV - SWRCB	Stormwater Program	Every 2 years	09/15/2010
Flood Control District Zone Boundaries	County	County DPW	As Needed	08/05/2008
Arroyo Toad	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Ash-Gray Indian Paintbrush	US Fish & Wildlife Service	County DPW	Annually	12/26/2007
Bear Valley Sandwort	US Fish & Wildlife Service	County DPW	Annually	12/26/2007
Bonytail Chub	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
California Gnatcatcher	US Fish & Wildlife Service	County DPW	Annually	12/19/2007
California Taraxacum	US Fish & Wildlife Service	County DPW	Annually	08/14/2008
Cushenbury Buckwheat	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Cushenbury Milkvetch	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Cushenbury Oxytheca	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Desert Tortoise	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Least Bell's Vireo	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Kangaroo Rat	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Mountains Bladderpod	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Mountain Yellow Legged Frog	US Fish & Wildlife Service	County DPW	Annually	09/14/2006
Parish Daisy	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Razorback Sucker	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
San Bernardino Bluegrass	US Fish & Wildlife Service	County DPW	Annually	08/14/2008
Santa Ana Sucker	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
Southern Mountain Wild-Buckwheat	US Fish & Wildlife Service	County DPW	Annually	12/26/2007
Southwestern Willow Flycatcher	US Fish & Wildlife Service	County DPW	Annually	06/24/2010
General Plan Bald Eagle Habitat	US Fish & Wildlife Service	County DPW	Annually	08/05/2008
General Plan Mojave Ground Squirrel	County	County DPW	Annually	07/30/2008
General Plan Desert Tortoise Habitat	County	County DPW	Annually	07/30/2008
Highways	County	County DPW	Annually	08/05/2008
Watersheds in San Bernardino	County	Multiple Sources	Annually	11/18/2004
Potentially Sensitive Areas	US Fish & Wildlife Service	County DPW	Annually	07/30/2008
Southern Rubber Boa	US Fish & Wildlife Service	County DPW	As Needed	07/30/2008
Delhi Sands	US Fish & Wildlife Service	County DPW	As Needed	07/30/2008
Street Network	County	County DPW	Annually	12/01/2010
Thomas Brothers Index	Program	Stormwater Program	Annually	07/30/2008
USGS Quads	National Geographics	Stormwater Program	Annually	07/30/2008
Aquifer	U.S. Geological Survey	Stormwater Program	Annually	03/20/2010
BMP	RBF	Stormwater Program	Annually	01/01/2011
City Storm Drain	Co-Permittees	Cities & Stormwater Program	Annually	11/06/2008
Contours	SBVWD & CBWM	SBVWD, CBWM & Stormwater Program	Annually	08/01/2007
Control Release Points	Program	County DPW & Stormwater Program	In work - Irregular	01/01/2011
Drainage Course	County	County DPW & Stormwater Program	Annually	05/11/2010
Hydromodification	Program	Stormwater Program	Annually	01/01/2011
Plumes	SBVWD & CBWM	SBVWD, CBWM & Stormwater Program	Annually	08/01/2007
Reports	Various Cities, County, Agencies	Stormwater Program	Bi-Annually	01/01/2011
Restoration Opportunities	Program	Stormwater Program	Annually	01/01/2011
Retrofit Opportunities	Program	Stormwater Program	Annually	01/01/2011
Septic Tank Inventory	County Assessor's Office	Stormwater Program & County DPW	Bi-Annually	12/03/2010
Hydromod Field Observations	Program	Stormwater Program	Annually	01/01/2011
Soils	NRCS	Stormwater Program	Annually	01/01/2011
Water Storage Facility	County	County DPW & Stormwater Program	Annually	05/11/2010



The data maintenance methodology has includes three methods for delivering updates to the Program for inclusion in the Geodatabase. They are as follows:

- 1) When possible, data will remain at its source (such as in the San Bernardino County DPW) and a network link will be developed over the Internet to allow this layer to be viewed as a service within the Geodatabase. This approach, also known as a “Mash-Up,” is the most reliable method, because it leaves responsibility for update in the hands of the owner of the original dataset and no additional activity is required on the behalf of the Stormwater Program to update the Geodatabase. Changes that occur on the source are immediately reflected on the Geodatabase. Likely candidates for this method include the aerial photography, streets base map, and parcel layers as they are maintained continuously by the County, which can provide a reliable service to which to connect.
- 2) When a data service is not available or not possible, the Stormwater Program will seek to accomplish a database synchronization process using ArcSDE. This process synchronizes the changes or “deltas” in the database, including geographic updates without the need for a wholesale replacement of the dataset. This will make the updates quick and simple and provide the most efficient method for updating the Geodatabase when the source is also using ArcSDE and is willing to participate in this update process.
- 3) The third update method consists of a standard manual update using a file Geodatabase, personal Geodatabase, or shape file as available. This method will be employed for datasets not maintained at the County, and from state and federal sources for which this is the primary method for data transfer.

The Program has diligently created, updated and imported metadata for the existing data layers in the Geodatabase. Metadata is a vital part of data maintenance and critical to the end-users. A brief description of the data, key words, publication date, and person by whom the data was received or created was incorporated into the metadata. The metadata has been updated over the course of WAP development, and it will continue to be kept current. The data dictionary, which includes this metadata, is provided in Appendix G, and the metadata has been included in the Geodatabase simply by clicking on any data layer in the table of contents.

Watershed Geodatabase Integration

Section XI.B.3.b.i of the Permit requires that the Geodatabase be integrated with the MSWMP, WQMP, and TMDLs. With this tool, the project proponent will design their proposed projects to meet Permit requirements, including applicable WQMP, TMDL and LID criteria. The approving Agency will then, in turn, review the project more effectively knowing that the project proponent followed the same protocol during the development planning process. Linking all of the pertinent components of the Watershed Protection Principles to the Geodatabase has created an efficient means of meeting Permit requirements while enabling all of the Permittees to stay informed of all aspects of the watershed.

The principles of the integration was built upon a) data and on-line platforms compiled by the Program as part of mapping efforts related to hydrologic conditions of concern (stream erosion and hydromodification), b) studies conducted that highlight benefits and opportunities associated with infiltration of stormwater (water quality and water resources), c) GIS-based tools and technologies developed by stormwater agencies, consulting professionals, and the non-profit environmental sector, d) land use data developed by planning agencies, and e) monitoring data.



6 Hydromodification Management and Monitoring Plans

6.1 Hydromodification Management Plan

The Hydromodification Management Plan (HMP) is based on the principles of hydrograph matching and stream rehabilitation. Hydrograph matching ensures that post-development hydrology (runoff volume, velocity, duration, time of concentration) is not significantly different from the pre-development hydrology for a 2-year return frequency storm. Stream rehabilitation is an effective way of modifying a stream channel in order to maintain equilibrium when subject to geomorphically significant flows and to restore a healthy benthic community and beneficial uses. The Hydromodification Management and Monitoring Plan has been completed in accordance with Section XI.B.3.b.ii and iii of the Permit, and is included within Appendix H. The Hydromodification Management Plan includes procedures for prioritization of water bodies based on drainage feature, hydromodification susceptibility, risk assessments, and opportunities for restoration. The Hydromodification Monitoring Plan evaluates hydromodification impacts for the drainage channels deemed most susceptible to degradation.

6.2 Hydromodification Monitoring Plan

The Hydromodification Monitoring Plan (HMoP) was established to validate the HMP by evaluating the effectiveness of BMPs in preventing/reducing impacts from hydromodification. It identifies sites to be monitored, provides an assessment methodology, and lists mandatory follow-up actions based on monitoring results. Monitoring focuses on assessing the stream condition by measuring changes due to scour or deposition, to verify if the channel is widening over time. The HMoP identifies the need to continuously monitor a spatially variable set of streams over time to best represent the range of the entire watershed and the changes that can occur due to variable inter-annual rainfall frequency and intensity. If necessary the benthic community will be monitored based on the criteria in the HMoP. Six preliminary monitoring locations that have a high risk of hydromodification susceptibility have been established within the HMoP.

6.3 Hydromodification Assessment

The Hydromodification Assessment Technical Memorandum, provided in Appendix B, examines the thresholds for determining whether a creek is subject to hydromodification impacts due to future development. Hydromodification impacts are the response of drainage to changes in runoff and sediment discharge. The impacts are difficult to quantify, because over time, significant changes in water flow and sediment load have led to a sediment imbalance resulting in erosional changes to drainages. The following criteria will be evaluated to determine if portions of the watershed could be excluded from potential hydromodification impacts: areas downstream of controlled release points (CRPs) and drainage reaches downstream of elevation 514 in Prado Basin. The proposed excluded portions are mostly concentrated at the downstream ends of sub-regional channels and areas draining directly to the Santa Ana River. Detailed evaluation and development of these proposed exclusions are discussed in Section 7.6 and within the Hydromodification Management and Monitoring Plan in Appendix H.

The majority of the upper watersheds that are tributary to non-EHM channels have been identified as areas requiring projects to consider hydromodification controls. The Watershed Geodatabase identifies all of the EHM and Non-EHM drainage facilities in the permitted area.



7 Long-Term WAP Development

7.1 Administration and Oversight

This document is designed to allow for revision as more information is developed in the watershed, barriers to watershed protection principles are identified, and innovative ideas to achieving the Watershed Protection Principles are identified. Updates to the document will occur at 3-year intervals. On-going updates will allow for this document to remain current with other watershed management requirements in the Santa Ana River Watershed. This document, the WQMP template and the LIP would typically be concurrently revised.

7.2 Watershed Benefit Estimation

Understanding the watershed benefits of any water quality implementation strategy is critical before decisions are made about implementation of regional BMPs. Promoting site-specific management is always the preferred method of pollutant removal and hydromodification management as it encourages true source control. Through the Geodatabase, the watershed priorities can be factored in, and multiple benefit implementation scenarios can be developed, where watershed benefits can be assessed for both project-specific and regional treatment BMPs.

Another aspect of the benefits assessment is to build on the already completed Regional BMP location-siting analysis. Part of this analysis was to identify existing multi-use (water quality, supply, natural resources) locations that could be economically retrofitted for additional purposes. When Regional BMPs are completed, the multi-use benefits will be addressed on a case-by-case basis.

Regional BMPs will be constructed only in those cases where on-site mitigative efforts are investigated and documented as "infeasible". On-site mitigation is the most effective and beneficial tactic in the improvement of water quality and watershed management.

7.3 Funding

Funding for water quality programs is jurisdiction specific and typically limited. Access to other funding sources is either not available or allowed.

The funding required for the promotion of the Watershed Protection Principles through the planning and development process is typically incurred at the project level through development fees. Each jurisdiction develops their funding mechanisms based on their municipal management approach.

Regional BMPs are currently not funded, and it is expected that either an in-lieu or special districts programs will need to be developed before these BMPs are actually constructed. Development of these programs will require legal review and, depending on the approach, approval from the property owners based on Proposition 218.

7.4 LIP Revisions

The environmental assessment processes described in this WAP document are to be incorporated into municipal codes and ordinances by the end of the current permit term. Where applicable, the Water Protection Principles will also be incorporated into each jurisdiction's General Plan and LIP as part of the next scheduled update.



7.5 WAP Linkages and Other Watershed Efforts

Linking all of the important components of the municipal NPDES Program will create an efficient and effective strategy in order to meet the new requirements. For each jurisdiction, the LIP is the key document for how their program will implement the Permit requirements. Supplemental to the LIP are the procedure-specific documents including this WAP, the WQMP, the LID Manual, and the Municipal Stormwater Management Plan.

Regionally, there are other programs also addressing watershed management. These include: the Stormwater Quality Standards Task Force (SWQSTF), One Water, One Watershed (OWOW), water basin management documents (CBWM, IEUA and SBVWD), and the Santa Ana Watershed Project Authority (SAWPA) Integrated Regional Watershed Management Plan (IRWMP). The IRWMP, published in 2007, sets forth a regional comprehensive approach to water use and recharge. Collaboration between the Program and the intent of the IRWMP (2007) historically has not been well defined. The IRWMP's intent and legal authority is focused on larger regional projects, water supply management and water recycling. The entities that have authorized the IRWMP have completed most of the IRWMP Tier 1 and 2 regional projects as the IRWMP provided for regional scale multi-user management. However these entities do not have any local land use authority, which resides with the local jurisdictions. The Co-Permittees' authority provides for the private parcel specific water resource management including conservation, HCOC, and water quality.

This document and the concepts contained herein, complement the IRWMP through the incorporation of sub-regional and site specific infrastructure designed to not only protect the physical conditions of a channel (HCOC mitigation BMPs), but also promote small scale recharge of the groundwater basin (LID and infiltration BMPs). The Program will continue to work with each of these appurtenant agencies to further the goals of the IRWMP.

And while these programs provide additional stakeholder input concerning watershed management, they are ancillary to the jurisdiction's planning process. As further regulatory requirements and watershed management concepts and policies are adopted by the appropriate governing entities, the Program will incorporate those items into their LIP and corresponding documents.

7.6 HCOC Exemption Area Determinations and Updates

The WQMP and Geodatabase contain documentation for Santa Ana River (SAR) watershed areas that have been determined to be exempt from HCOC requirements. Conditions that would provide for a project site to be exempt from HCOC mitigation include:

- **Sump Condition:** All downstream conveyance channel to an adequate sump (for example, Prado Dam, Santa Ana River, or other Lake, Reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.
- **Pre = Post:** The runoff flow rate, volume and velocity for the post-development condition of the Priority Development Project do not exceed the pre-development (i.e, naturally occurring condition for the 2-year, 24-hour rainfall event utilizing latest San Bernardino County Hydrology Manual.
 - Submit a substantiated hydrologic analysis to justify your request.



- Diversion to Storage Area: The drainage areas that divert to water storage areas which are considered as control/release point and utilized for water conservation.
 - See Appendix F for the HCOC Exemption Map and the on-line Geodatabase (<http://sbcounty.permitrack.com/wap>) for reference.
- Less than One Acre: The Priority Development Project disturbs less than one acre and is not part of a common plan of development. The Co-Permittee has the discretion to require a Project Specific WQMP to address HCOC on projects less than one acre on a case by case basis.
- Built Out Area: The contributing watershed area to which the project discharges has a developed area percentage greater than 90 percent.

As further information is gathered, the Geodatabase HCOC exemption information will be updated. Creation of additional HCOC mitigation area will be presented to the RWQCB for review and approval prior to implementation and update of the Geodatabase. Information that can impact the geographic extent of HCOC exemptions include:

- Creation of a controlled release point through implementation of a retrofit opportunity.
- Removal of a controlled release point designation from a water storage area that is no longer utilized for water conservation.
- Further development resulting in a watershed area from which a project discharges having greater than 90% "buildout."
- Re-classification of a channel or conveyance.
- Analysis of hydromodification monitoring data.

Once the RWQCB has provided their approval of the revised HCOC mitigation exemption area extents, the Program will update Geodatabase and disseminate the information to all Co-Permittees.

7.7 System-wide Regional Retrofit Opportunities

In compliance with Section XI.B.3.b.vii of the Permit, the Evaluation of Retrofit Sites for Water Quality Improvements which furthers the System-wide Evaluation to Identify Retrofit Opportunities has been completed and can be found in Appendix E. As part of Phase 1 of the WAP, a system-wide evaluation identified opportunities to retrofit existing stormwater conveyance systems, parks, and other recreational areas with water quality measures. Phase 2 of the WAP required each of those sites to be evaluated in the context of the water quality improvement needs of the sub-watershed and watershed. This evaluation was broken into individual retrofit studies focused on 1) TMDLs; 2) Hydromodification Management; and 3) an LID Offset Program.

Retrofit locations have been evaluated based on property ownership, location within subwatershed (applicability), multi-use benefits and development needs. At this time there are no approved retrofit locations and LID Offset or in-Lieu programs have not been developed.

7.8 System-wide Evaluation of Restoration Opportunities

Along with potential retrofit sites, an evaluation was completed to identify opportunities to restore existing engineered channels to their most natural condition possible. Engineered channels can be lined with concrete and or rock or be unlined. Typically, engineered channels



convey runoff to downstream conveyance systems as fast as possible. In some cases, it can increase pollutant levels in stormwater runoff. Increased velocities increase the potential for erosion, which immediately degrades water quality and downstream habitat.

A system wide evaluation was conducted to identify opportunities to address stream segments vulnerable to hydromodification impacts. Identifying restoration opportunities for hardened and engineered streams and channels, along with contributing jurisdictions were a priority in this evaluation.

Channel restoration sites were identified by examining aerial photographs and visual inspections of major channel segments. Only channel segments that the Flood Control District owned or had easements for were included in this assessment, as implementing retrofit projects in privately-owned channels would be more time consuming and costly.

Channels were segregated by basic criteria including hardened or engineered, vulnerable to hydromodification, had sufficient room to widen, not subject to significant capital costs, and which restoration of the channel would not adversely affect the primary conveyance of the facility. Baseline inspections and analysis were completed per Surface Water Ambient Monitoring Program (SWAMP) protocol.

Removal of channel lining reduces the conveyance capacity of the channel, making this option untenable due to the resulting impacts to public and property safety. Therefore, the focus of the assessment was primarily on unlined (earthen) channel segments. Since introducing a vegetated lining on an unlined channel may reduce flood conveyance capacity by loss of channel depth or increased channel roughness, the potential to create a wetland/planted area was limited to those channel segments where there appeared to be sufficient right-of-way to accommodate an increased channel width. A number potential restoration sites were identified during this initial system-wide evaluation. Further investigations of these potential restoration sites will be conducted to determine project feasibility as it relates to protection of public health and safety, environmental impacts to habitat and overall benefit to the SAR Watershed.

7.9 Recommendations for Streamlining the Regulatory Process

Streamlining the regulatory process is a function of developing regional acceptance of proposed management criteria with all stakeholders including the regulatory agencies. A key step is to develop recommendations for streamlining regulatory agency approval of regional treatment control BMPs. The recommendations should include information needed to be submitted to the RWQCB, California Department of Fish and Game, US Fish & Wildlife and US Army Corps of Engineers for approval of regional treatment control BMP. At a minimum, this information should include BMP location; type and effectiveness in removing pollutants of concern; description and analysis of the hydrologic subareas to be managed by the regional treatment system; engineering design details; funding sources for construction, operation and maintenance, and parties responsible for monitoring effectiveness, operation and maintenance. While there may be some common components and design similarities between potential regional treatment BMPs, the variations in local geology, habitat, size and space requirements, drainage needs, and local groundwater and surface water quality impacts preclude a "one-size fits all" approach. The most beneficial efforts will be in using RWQCB assistance in coordinating and resolving issues during the environmental clearance components in the planning stage.



The Co-Permittees are also encouraged to collaborate and work with adjacent jurisdictions to facilitate and coordinate these recommendations. The following steps are recommended:

- Obtain approval on hydromodification exemptions
 - Ongoing collaboration with Regional Water Board
- Develop conceptual agreement with Regulatory Agencies
 - Standard environmental criteria: baseline and exemptions
 - Standard engineering criteria: flood control, public safety, water quality
- Develop conceptual typical designs for regional use
- Develop example operations and maintenance criteria
- Develop effectiveness assessment strategies
- Strategize opportunities for funding:
 - Grant funding requirements

Project implementation will begin once the stakeholders have completed the preliminary program development and a budget is determined. It will be imperative for the RWQCB to take the regulatory lead on the overall program regulatory agency collaboration in order to develop practical agreement. Programmatic and project specific scheduling cannot be estimated at this time. The stakeholders and agencies would have to come to preliminary agreement on baseline conditions for scheduling to occur.



Appendix A: Stakeholder Workshop Series Notes





Appendix B: Hydromodification Assessment Technical Memorandum





Appendix C: Channel Assessment and Classification Technical Memorandum





Appendix D: Causes of Degradation Technical Memorandum

San Bernardino municipalities subject to the Middle Santa Ana River Pathogen TMDL have coordinated the development of water quality monitoring programs. As a result, the program developed for purposes of implementing the Basin Plan Amendment developed by the SWQSTF (above) will suffice for implementation of the TMDL. Dischargers and stakeholders in the watershed continue to explore the potential for a single, coordinated water quality monitoring program throughout the watershed for all purposes.





Appendix E: Evaluation of Retrofit Sites for Water Quality Improvements (Phase II) and the System-wide Evaluation to Identify Retrofit Opportunities Technical Memorandum (Phase I)





Appendix F: System-wide Evaluation to Identify Restoration Opportunities Technical Memorandum





Appendix G: Watershed Geodatabase Data Dictionary





Appendix H: Hydromodification Management and Monitoring Plan





Appendix I: WAP Development Task Force





Appendix J: Watershed Geodatabase Workshops

